# NAVAL POSTGRADUATE SCHOOL
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# THESIS

**ANALYSIS OF ENLISTED RECRUITING PATTERNS WITHIN THE DEPARTMENT OF THE NAVY**

by

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In order to improve business practices within the Department of the Navy, an analysis of the advantages and disadvantages of optimizing the schoolhouse and its effects upon recruiting, recruit training, and the fleet is currently underway. As part of this analysis, this thesis examines if there is an optimal recruiting pattern within both the Navy and the Marine Corps based upon historical data. With a data base consisting of 23,590 enlistment records, standard statistical and quantitative methods are used to analyze DEP attrition, first-term attrition, and reenlistment rates. Additionally, the monthly cost per recruit is analyzed for four functional cost areas for the Navy area and Marine Corps district recruiting levels.

Major findings are: the longer a poolee remains in the DEP, the more likely the poolee will attrit from the DEP. Poolees who survive the DEP, however, are more likely to complete their first-term of enlistment as their time in-DEP increases. As time in-DEP increases, a Navy poolee is less likely to reenlist; in the Marine Corps, a poolee is more likely to reenlist. For both the Navy and Marine Corps, the highest quality shippers, per contract cost, occur during July, August, and January.

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# ANALYSIS OF ENLISTED RECRUITING PATTERNS WITHIN THE DEPARTMENT OF THE NAVY

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Submitted in partial fulfillment
of the requirements for the degree of

**MASTER OF SCIENCE IN MANAGEMENT**

from the

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**December 1997**

# ABSTRACT

In order to improve business practices within the Department of the Navy, an analysis of the advantages and disadvantages of optimizing the schoolhouse and its effects upon recruiting, recruit training, and the fleet is currently underway. As part of this analysis, this thesis examines if there is an optimal recruiting pattern within both the Navy and the Marine Corps based upon historical data. With a data base consisting of 23,590 enlistment records, standard statistical and quantitative methods are used to analyze DEP attrition, first-term attrition, and reenlistment rates. Additionally, the monthly cost per recruit is analyzed for four functional cost areas for the Navy area and Marine Corps district recruiting levels.

Major findings are: the longer a poolee remains in the DEP, the more likely the poolee will attrit from the DEP. Poolees who survive the DEP, however, are more likely to complete their first-term of enlistment as their time in-DEP increases. As time in-DEP increases, a Navy poolee is less likely to reenlist; in the Marine Corps, a poolee is more likely to reenlist. For both the Navy and Marine Corps, the highest quality shippers, per contract cost, occur during July, August, and January.

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# 1. INTRODUCTION

## A. BACKROUND

Within the Department of the Navy (DON), the Delayed Entry Program (DEP) is the primary vehicle for accessing new recruits into both the Navy and Marine Corps. *Applicants* are contracted into the DEP for a fixed period of time, ranging from 30 to 365 days. While in the DEP, new recruits are referred to as *DEP'ers or poolees.* Those recruits who ship to recruit training in less than 30 days are referred to as *direct shippers* or *directs.*

The DEP is a key ingredient in both service's recruiting practices, benefiting both the services and the applicant. The services benefit by more efficiently scheduling follow-on training, since they have more time to find qualified applicants. On the other hand, applicants benefit by finding the type of job training they desire.

Both the Navy and Marine Corps experience large fluctuations in the monthly number of recruits reporting to recruit training. This reflects a recruiting cycle that is driven by graduating high school seniors. This group makes up over 50 percent of annual Navy and Marine Corps accessions. Monthly accessions peak during the summer months, after high school graduation, when the primary recruiting population is at its maximum. Conversely, accessions are lowest during the spring months. The primary population is significantly less, making recruiting more difficult.

The monthly accession profile of enlisted students reporting to recruit training reflects a variety of factors, including fleet and personnel needs, budgetary constraints, and the

size of the training establishment. Studies on accession profiles primarily focus on the level loading of monthly accessions -- accessing a constant monthly volume of recruits into the respective service. A level load accession profile has appeal. Without any peak accession months, the service's can minimize training infrastructures. However, both the Navy and Marine Corps have accessed varying recruit cohorts each month of the year. The Navy has never executed an accession profile that was within 20 percent of a level load [Ref. 1]; the Marine Corps has had about a 15 percent variation in phasing from month to month [Ref.2].

## B. OBJECTIVES/RESEARCH QUESTIONS

In an effort to improve business practices within the DON, the Organization Management and Infrastructure Team is analyzing the advantages and disadvantages of attempting to optimize the schoolhouse and its effects upon recruiting, recruit training, and the fleet. In the recruiting business, however, it is believed that level loading the schoolhouse reduces both recruiting efficiency and effectiveness. This research will analyze if there is an optimal enlisted recruiting pattern based upon historical enlistment data. To determine if there is an optimal enlisted recruiting pattern, this research will:

1. Examine variance between contract signing and shipping date by month of the year.

2. Examine the effect the length of delay in the DEP has on DEP attrition and the causes for failure to report to recruit training.

3. Determine if there is a correlation between time in the DEP and both completion of enlistment and reenlistment.

4. Determine the monthly cost per recruit for different recruiting expenses.

## C. LITERATURE REVIEW

Both the Navy and the Marine Corps began studying DEP and first-term attrition during the late 1980s. The primary analysis of attrition for both service's has been conducted by the Center for Naval Analysis (CNA). In 1986, Quester and Murray at CNA found that certain shipping months significantly affected DEP attrition in the Navy. They concluded that poolees scheduled to ship during May were more likely to attrite than those scheduled to ship during October. A possible explanation for the month-of-shipment differences being the availability of desired follow-on training opportunities for October shippers.

In 1989, research conducted by Cooke and Quester at CNA, revealed that high school diploma graduate (HSDG) recruits, who enter the Navy through the DEP, have greater success adapting to life in the Navy than do other recruits. Having realized this differential success, they report that the Navy's current accessions are more likely than ever to enter from the DEP as HSDGs.

In the following year (1989), Cooke and Quester (CNA) conducted research on Navy first-term attrition. Their research revealed that first-term attrition in the Navy was up, with the sharpest increases in very early attrition. Attrition rates after the first few months of service, however, increased as well. Additionally, they reported that non-HSDGs and individuals who ship within a month of signing their enlistment contract (direct shippers) have significantly higher attrition rates than HSDGs or accessions from the DEP.

In 1990, Kimble, North and Quester at CNA conducted research to identify successful Marine Corps recruits. They found that HSDG accessions, certificate accessions over the age of 20 years, Armed Force Qualification Test (AFQT) categories I-IIIA accessions, accessions from the DEP, and accessions who met the in-service weight standards for their height are most likely to adapt successfully to Marine Corps life.

In 1991, Cooke and Pflaumer at CNA reviewed DEP attrition, including research on the relationship between time-in-DEP and first-term attrition. Their research revealed that first-term attrition is inversely related to the time spent in the DEP. Thus, increasing the time poolees spend in the DEP lowers their first-term attrition rate.

Also in 1991, Quester at CNA conducted research on first-term attrition in the Marine Corps. She states that first-term non-end of active duty service (EAS) attrition appears to be increasing and that the Corps has not translated its improved accession quality into reduced attrition. The percentage of Marines currently leaving the Corps before EAS is about the same as it was during the early 1980s, when recruit quality was considerably poorer. Using the results from several previous analysis, she also found non-EAS attrition to be higher for recruits who are non-HSDGs, score lower on the AFQT, do not access through the DEP, and do not meet the retention height/weight standard.

In summary, previous research has shown that increasing time-in-DEP increases the likelihood of attriting from the DEP, but lowers the likelihood of attriting during the first-term.

## D. SCOPE AND LIMITATIONS

This thesis covers only regular component enlistments for both the Navy and Marine Corps for those recruits contracted during fiscal years 1989-1991. Data from this period covers a recruit from contract through reenlistment. Additionally, neither the Navy or Marine Corps recruiting commands keep detailed monthly financial records of all activities. What obligations and expenditures they do track are fairly different. Both recruiting commands had reservations about divulging financial data, fearing that this research could warrant a future budget mark. Therefore, the financial analysis is restricted to the best information available. The best information available includes the Navy area and Marine Corps district obligation records over the past two fiscal years, 1996 and 1997.

## E. THESIS ORGANIZATION

The next chapter describes methodology and the data provided by the Defense Manpower Data Center West and both the Navy and Marine Corps Recruiting Commands. Data is analyzed and interpreted in Chapter III. Conclusions and recommendations are given in the final chapter.

## II. DESCRIPTION OF DATA AND METHODOLOGY

### A. ENLISTMENT RECORDS

A total of 23,590 records were provided by the Defense Data Management Center West for this study. The records were drawn from three separate MEPCOM data bases and converted to an Excel spreadsheet. The data tracks a recruit from contract to reenlistment. With this data, standard statistical and quantitative methods were used to analyze DEP attrition, first-term attrition, and reenlistment rates for both the Navy and Marine Corps. Table I summarizes the data base used for the analysis.

**Table I** Data Base Breakdown (DEP Contracts FY 1989-1991)

| Factor | Service | Level | Number of Records |
|---|---|---|---|
| Contracts | Navy | | 11,750 |
| | Marine Corps | | 11,840 |
| Shippers | Navy | | 9,716 |
| | Marine Corps | | 9,283 |
| Attrition Type | Navy | DEP | 2,034 |
| | Marine Corps | DEP | 2,557 |
| | Navy | Before 1st Term | 3,575 |
| | Marine Corps | Before 1st Term | 2,449 |
| Reenlistment | Navy | | 1,785 |
| | Marine Corps | | 561 |

After analyzing DEP attrition, 2,598 records had to be eliminated because the first-term of enlistment and reenlistment data was not resident. This required eliminating 815 Navy records and 1,783 Marine Corps records. The data base includes only regular

non-prior service contracts for fiscal years 1989 through 1991.

Table II describes the factors used to analyze the data.

**Table II** Factors Analyzed

| Factor | Description | Levels |
|---|---|---|
| Quality | Education | High School Diploma Grad (HSDG) or Higher |
| | AFQT Score | I-IIIA (Score 50+) |
| Month of Contract | Actual month poolee sworn into the DEP | Ranges by FY from October to September |
| Time in DEP | Actual time spent in the DEP | 1 to 12+ months |
| Attrition Type | When attrition occurs | 1. DEP Loss<br>2. 1st Term (At least one year before EAS) |
| Attrition Reason | Reason for DEP attrition | 1. Medical<br>2. Moral<br>3. Apathy<br>4. Refusal<br>5. Failed to complete High School<br>6. Pursue Higher Education<br>7. Component Transfer |
| Reenlistment | Did reenlistment occur | 1. Yes<br>2. No |

## B. FINANCIAL DATA

Financial reports for fiscal years 1996 and 1997 were provided by both the Navy and Marine Corps Recruiting Commands. The Navy and Marine Corps Recruiting Commands are organized differently; for the purpose of a financial analysis, the Navy's Recruiting

Area and the Marine Corps' Districts are treated equally. There are four Navy Area Headquarters and six Marine Corps District Headquarters.

The Navy Recruiting Command (NRC) provided quarterly cumulative obligation reports for their recruiting areas; the Marine Corps Recruiting Command (MCRC) provided monthly cumulative obligation reports for their recruiting districts. To keep the analysis equal, cumulative quarterly totals for each service are divided equally between the respective months of the quarter. Additionally, both services track cost areas differently. The four most uniform functional cost areas were analyzed at area/district level: communications, vehicles, automated data processing (ADP), and advertising. To determine the monthly cost per recruit for each functional cost area, regular component gross contracts for fiscal years 1996 and 1997 were provided for each service by Defense Data Management Center West. Additionally, each Recruiting Command provided a Recruiting Resources Summary Report for fiscal years 1996 and 1997. They submit this report bi-annually to the Secretary of Defense.

## C. OPTIMAL RECRUITING PATTERN

With the data discussed in this chapter, optimal recruiting months for both the Navy and Marine Corps are determined by combining quality shipping percentages by month of contract and the combined cost per contract for the four selected functional cost areas.

# III. ANALYSIS OF DATA

## A. DEP ATTRITION

Figure 1 compares DEP discharge rates between the Navy and the Marine Corps by the month a poolee contracted. For fiscal years 1989-1991, DEP attrition reached 17.25% for the Navy and 21.44% for the Marines. Both services show monthly fluctuations in percent attrition with higher discharge rates during the summer contracting period. The Navy's DEP attrition decreases continuously from 16.9% in October to 13.3% in April, then continually increases to its maximum of 20.4% in July, and drops slightly to 19.0% in September. On the other hand, the Marine Corps DEP attrition appears to fluctuate seasonally for most of the year with seasonal peaks in November, March, July, and a maximum peak of 26.7% in September. The November and March seasonal peaks, however, are lower than the large attrition percentages found during June, July, and August.

Figure 2 compares DEP discharge rates for both the Navy and Marine Corps by the number of months a poolee is in the DEP. Both services show a continual increase in the percentage of attrition for poolees that remain in the DEP from one to seven months. There is a small dip in the eighth month attrition rate, with a slight but steady increase out to the eleventh month, and a large spike in the twelfth month. For both services, the longer a poolee stays in the DEP, the more likely the poolee will be discharged.

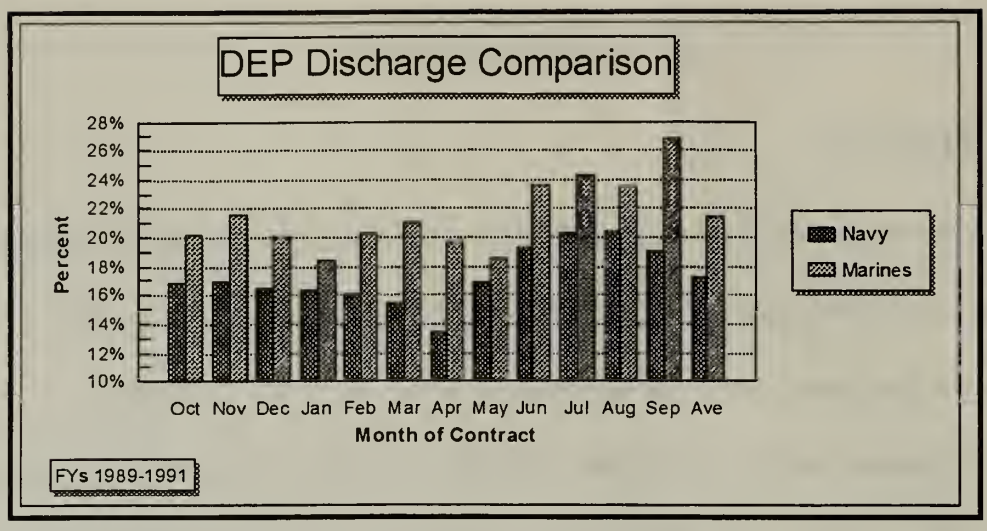


**Figure 1** DEP Discharge Comparison by Month of Contract

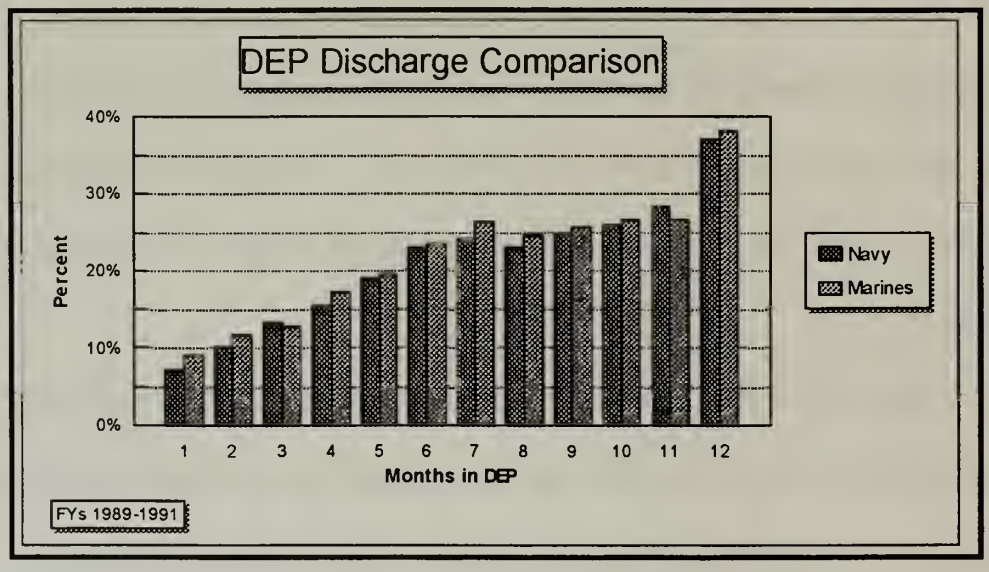


**Figure 2** DEP Discharge Comparison by Months in DEP

Figure 3 shows the average time in DEP plus and minus one standard deviation for the Navy and Figure 4 shows the same information for the Marine Corps. Both figures are graphed by the month the poolee contracted.

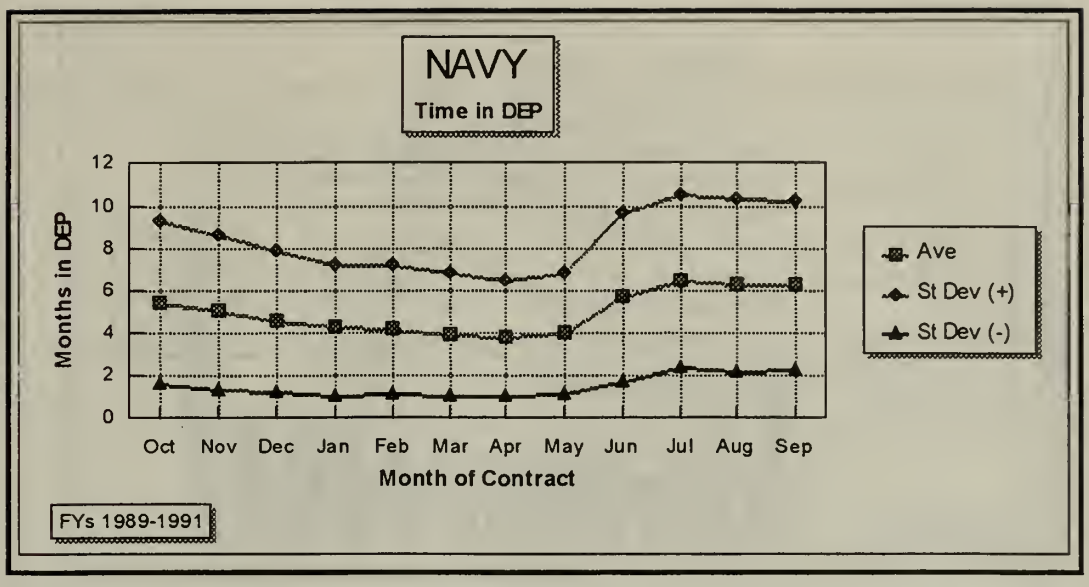


**Figure 3** Navy Average Time in DEP with One Standard Deviation

The average time-in-DEP for the Navy was 4.98 months with a standard deviation of 3.44 months; the average for the Marines was 6.4 months with a standard deviation of 3.84 months. Both services show lower averages during the spring season, due to near-term shipping requirements; averages are higher during the summer because high school seniors are contracted and scheduled to ship the following summer after high school graduation. There are two possible reasons why the time-in-DEP differs between the Navy and Marines: the availability of follow-on training spaces and/or the efforts to build the DEP pool to reduce the number of near-term shippers during the spring shipping season.

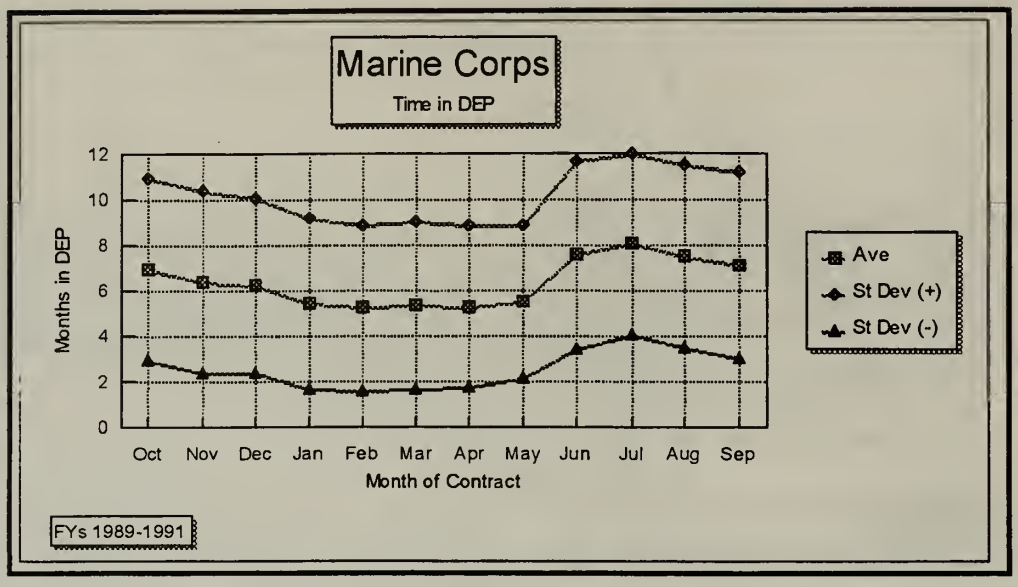


**Figure 4** Marine Corps Average Time in DEP with One Standard Deviation

Figure 5 compares the percentage of contracts placed by months in the DEP for the Navy and Marine Corps. The Navy's percentage of contracts placed is higher for the near-term, one-to-seven months in the DEP; the Marines' percentage of contracts placed is higher for the long-term, eight-to-twelve months in the DEP.

Figure 6 compares cumulative contract placements by months in the DEP for the Navy and Marine Corps. The Marine Corps has poolees in the DEP longer than the Navy and the cost to the Marines is a higher DEP attrition rate. These two figures suggest that the Marine Corps' heavier reliance on other services for follow-on training reduces the Marines follow-on training availability. Thus, the Marine Corps must emphasize pool building relative to the Navy.

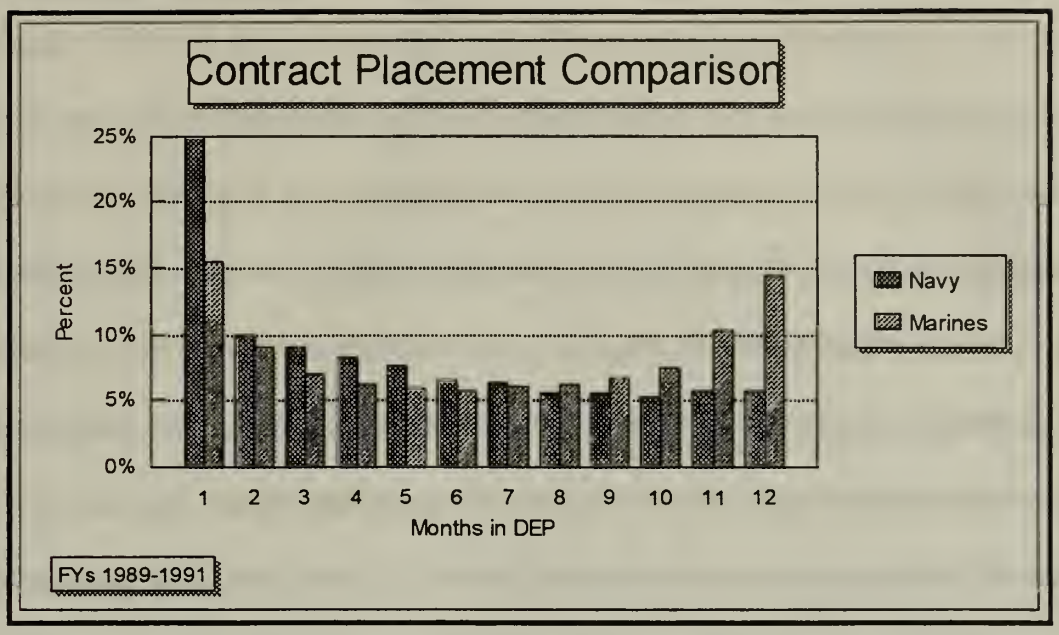


**Figure 5** Contract Placement Comparison by Months in DEP

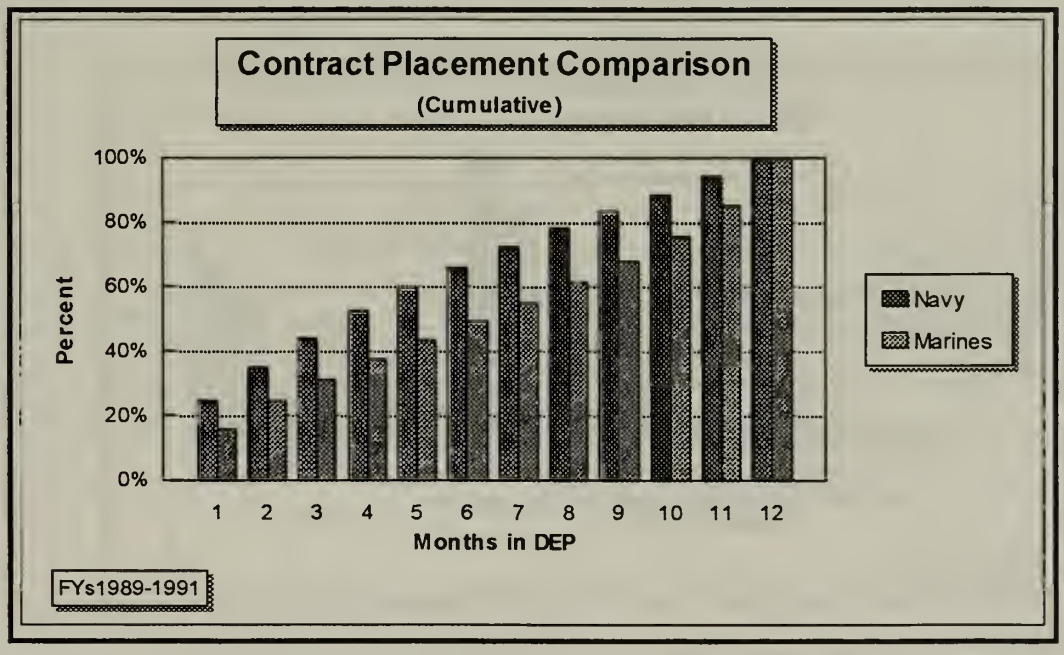


**Figure 6** Cumulative Contract Placement Comparison by Months in DEP

This constraint may also have an effect upon DEP discharge quality. The percent of quality contracts for the Navy and Marine Corps are almost the same: 56.07% for the Navy and 56.04% for the Marine Corps. Quality contracts shipped, however, are somewhat higher for the Navy at 51.57%, than the Marine Corps, at 51.06%. The Navy's percentage of quality DEP discharges is .49% or half a percent lower than the Marines. Figure 7 compares quality DEP discharges between the Navy and Marine Corps. This figure shows the relationship between the overall DEP attrition rate and the quality DEP attrition rate for both services. For the majority of the months in which a poolee was contracted, the Marines' attrition rate for both overall DEP and quality DEP poolees met or exceeded both the combined Navy and Marine Corps average DEP attrition rate of 19.5% and the quality DEP attrition rate of 4.7%.

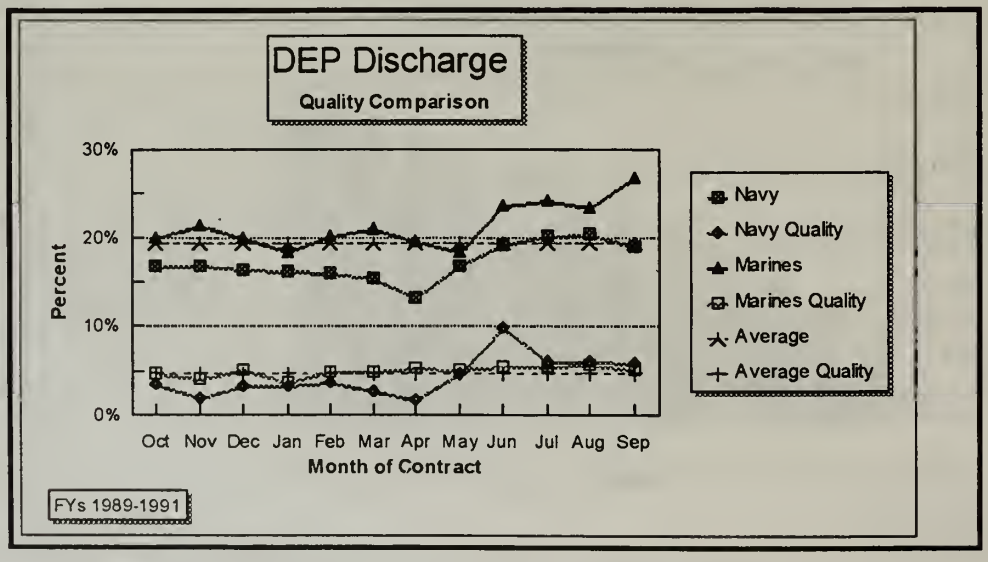


**Figure** 7 DEP Discharge Quality Comparison by Month of Contract

Figure 8 compares DEP discharges by reason for discharge for the Navy and the Marine Corps during fiscal years 1989-1991. The percentage rates are not precise because many discharge records are missing their discharge code. However, Figure 8 compares the seven most likely reasons based upon records with a discharge code. In both services, the reason a poolee is most likely to discharge is for Refusal to Enlist/Did not Report. This percentage is 23.1% for the Navy and 18.4% for the Marines. For the Navy, the next most common reasons to attrit from the DEP was a failure to graduate high school, 14.9%, and medical disqualification, 14.1%. For the Marine Corps, the next most common reasons to attrite from the DEP was medical disqualification, 12.0%, and failure to graduate from high school, 10.3%.

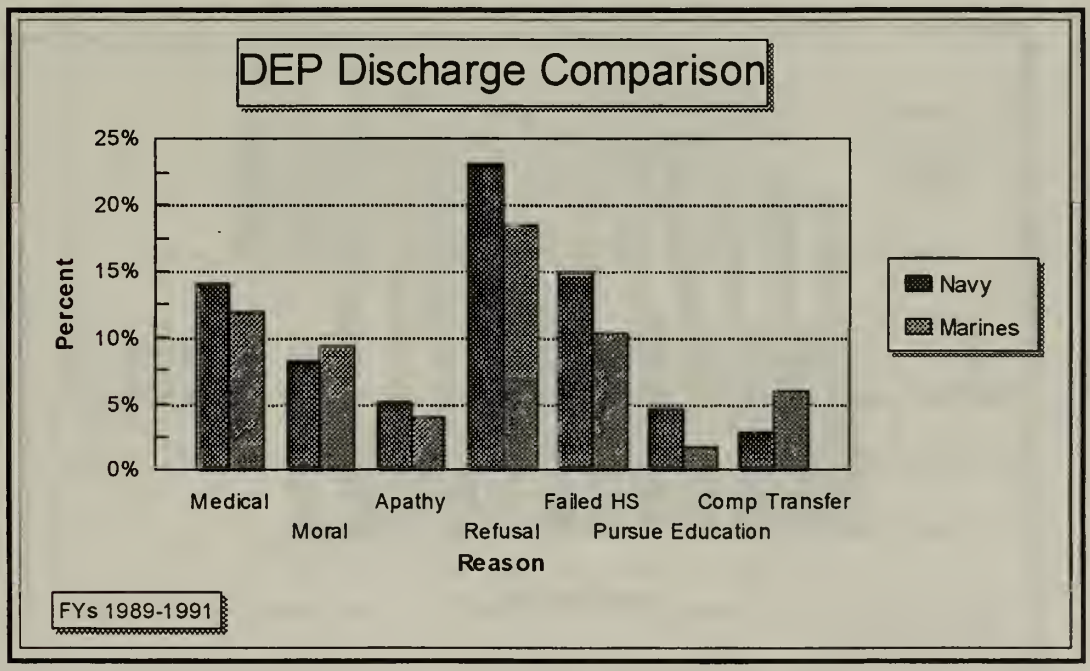


**Figure 8** DEP Discharge Comparison by Reason for Discharge

## B. COMPLETION OF FIRST TERM ENLISTMENT AND REENLISTMENT

### 1. Completion of First-term

Figure 9 compares Navy and Marine Corps DEP'ers completing their first-term of enlistment, by the number of months spent in the DEP. The percentage of Navy DEP'ers who complete their first-term of enlistment is 52.2%, while 61.1% complete their first-term in the Marine Corps. The percentage of DEP'ers who complete their first-term of enlistment fluctuates somewhat based upon the number of months in the DEP. In general, both services show a decreasing trend: the percentage of those who complete their first-term of enlistment decrease as poolees increase their time in the DEP out to twelve months.

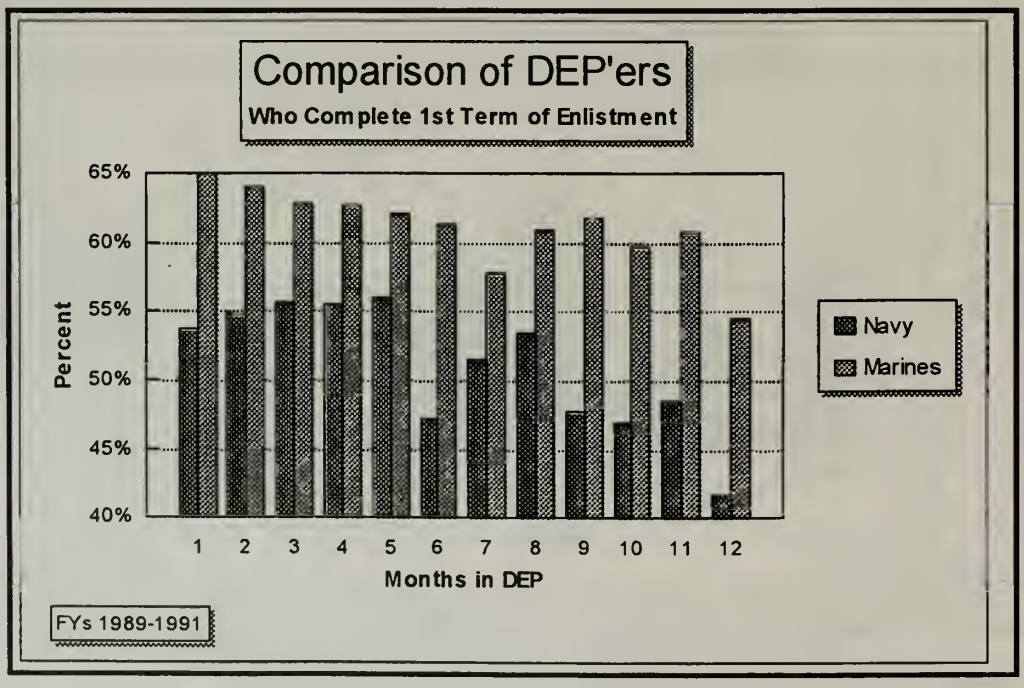


**Figure 9** Comparison of DEP'ers Who Complete First-term of Enlistment

Figure 10 compares Navy and Marine Corps DEP'ers who complete their first-term of enlistment by the month the poolee was contracted. In the Marine Corps, poolees who are contracted during the first quarter (October- December), are more likely to complete their first-term of enlistment. In the Navy, poolees who are contracted during October, December, February, and April are more likely to complete their first-term of enlistment. Overall, poolees in both services who are contracted during the peak summer months are less likely to complete their first-term of enlistment, largely due to their high percentage of DEP attrition.

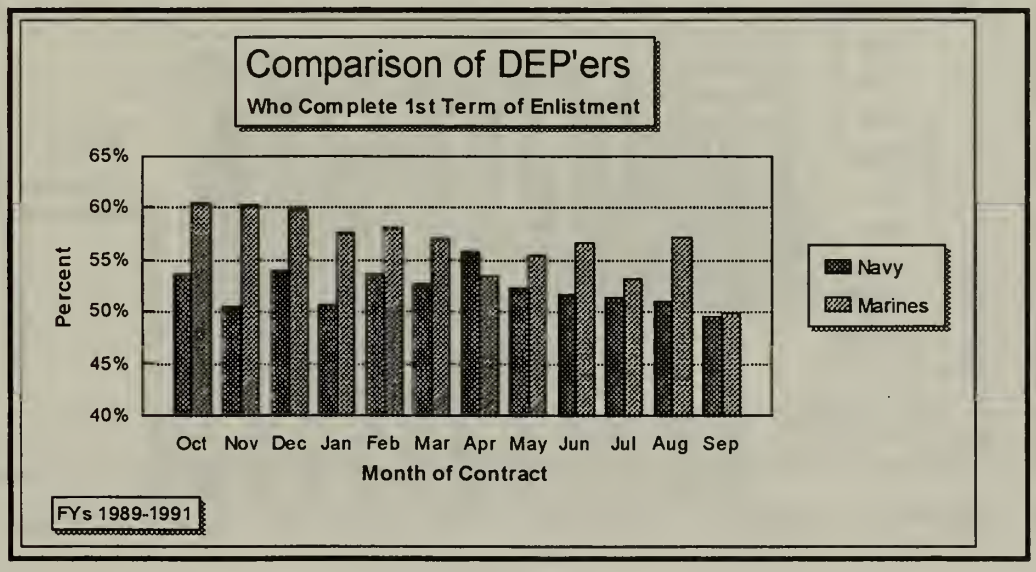


**Figure 10** Comparison of DEP'ers Who Complete First-term of Enlistment

Figure 11 compares Navy and Marine Corps shippers who complete their first-term of enlistment, by the number of months the poolee spent in the DEP. The average percentage of shippers who complete their first-term of enlistment is 61.5% in the

Navy and 71.5% in the Marine Corps. The percentage of shippers who complete their first-term of enlistment fluctuates somewhat based upon the number of months in the DEP, but both services show an increasing trend between those who complete their first-term of enlistment and their time in the DEP. This indicates that the DEP acts as a natural filter during the enlistment process. Overtime, those poolees who survive the DEP, are more likely to complete their first-term of enlistment.

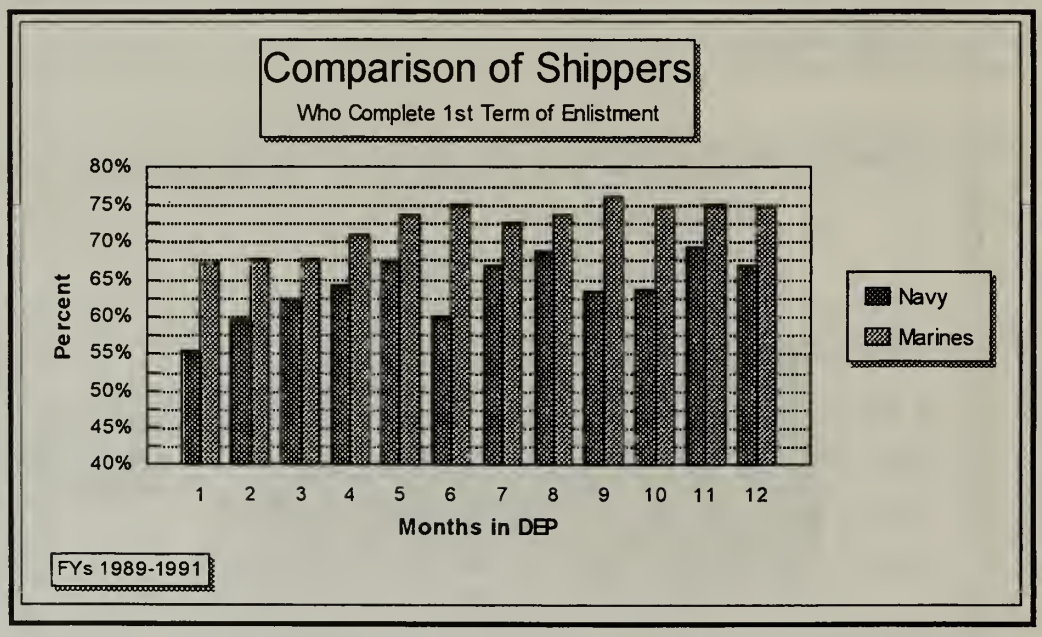


**Figure 11** Comparison of Shippers Who Complete First-Term of Enlistment

**2. Reenlistment**

Figure 12 compares Navy and Marine Corps DEP'ers who reenlist after their first-term of enlistment, by the number of months a poolee spent in the DEP. The average percentage of DEP'ers who reenlist is 16.3% in the Navy and 5.6% in the Marines. This is

a fairly significant difference of over 10%, however, reenlistment rates depend upon the number of spaces available for continued service. With a smaller force structure, the Marine Corps reenlists fewer DEP'ers than the Navy. For both services, the percentage of reenlistments fluctuates monthly. However, there is a difference across services. As time in DEP increases for Navy poolees, the percentage who reenlist tends to decrease; in the Marine Corps, as time in DEP increases, the percentage of poolees who reenlist increases as shown in Figure 13. This trend indicates that Marine Corps poolees who stay in the DEP for longer periods and ship to recruit training are more likely to reenlist.

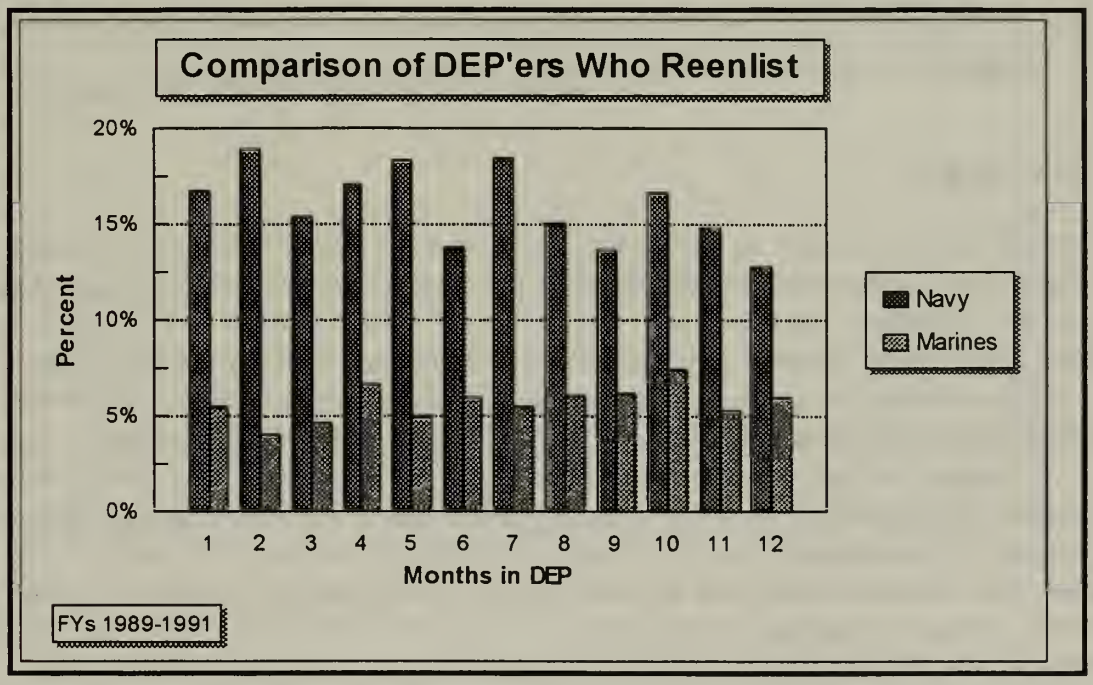


**Figure 12** Comparison of DEP'ers Who Reenlist by Months in DEP

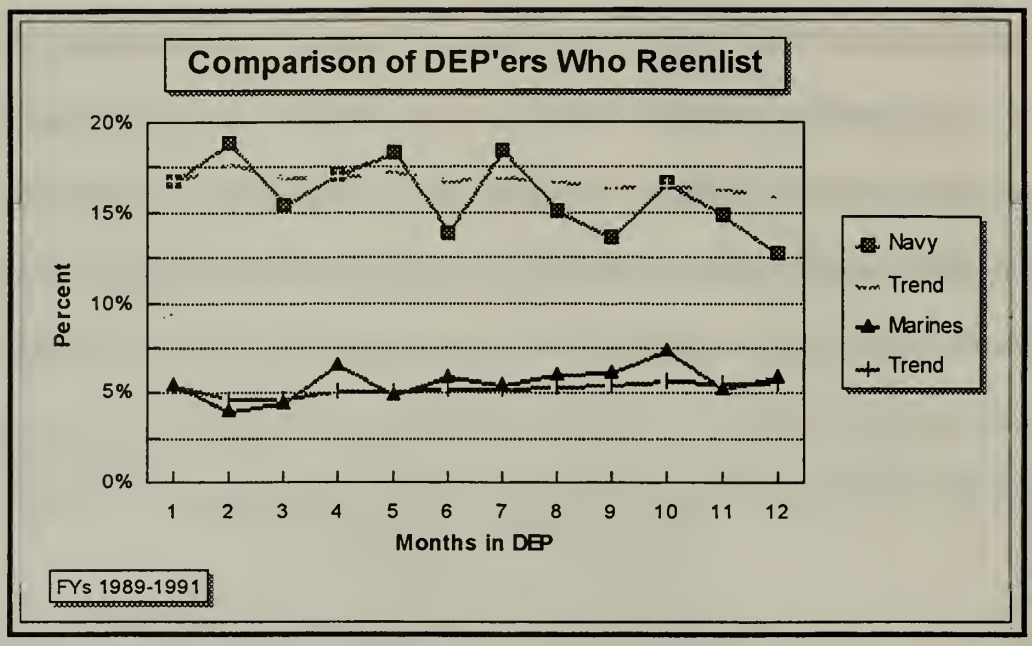


**Figure 13** Comparison of DEP'ers Who Reenlist by Months in DEP

## C. FINANCIAL

Figure 14 compares communications costs per contract between the Navy and Marine Corps. The average Marine Corps district's communications cost per contract exceeds the Navy area's cost per contract by $121, or 31%. Both services' communications costs are highest in the graduate market contracting period, due to the low volume of February through May contracts needed for near-term shipping requirements. Conversely, both services' communications costs are lowest during the high volume, high school senior oriented contracting period in June, July, and August.

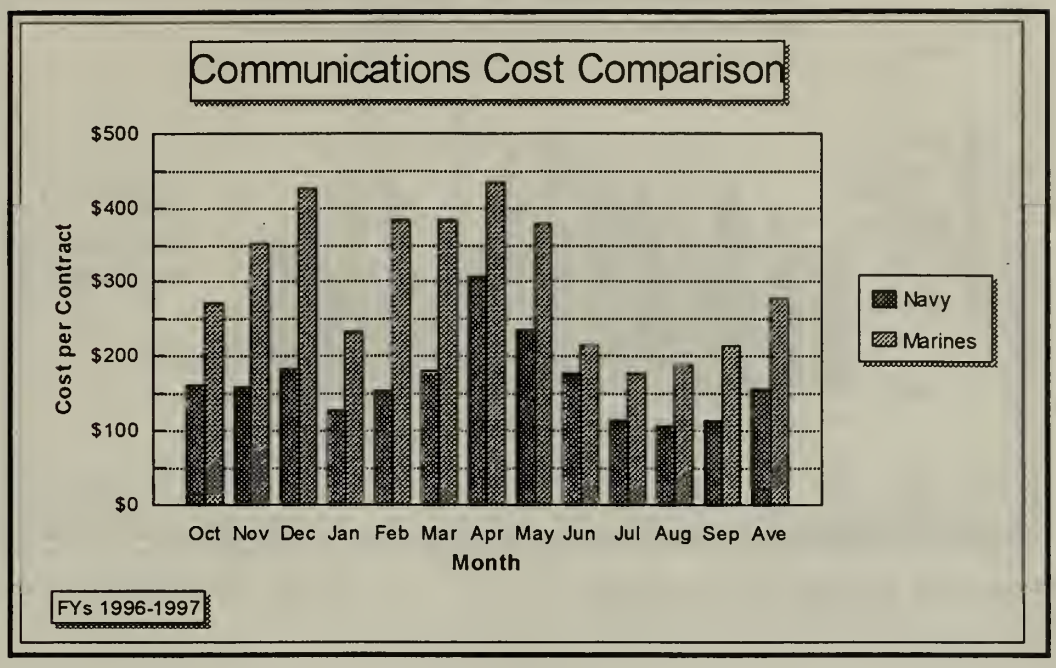


**Figure 14** Communications Cost Comparison

Figure 15 compares vehicle costs per contract between the Navy areas and Marine Corps districts. The average Marine Corps district's vehicle cost per contract is $14, or 8% higher than the Navy area's vehicle cost per contract. Again, both services' vehicle costs are highest in the graduate market contracting period due to the low volume of February through May contracts needed for near-term shipping requirements. Conversely, both services' vehicle costs are lowest during the high volume, high school senior oriented contracting period in June, July, and August.

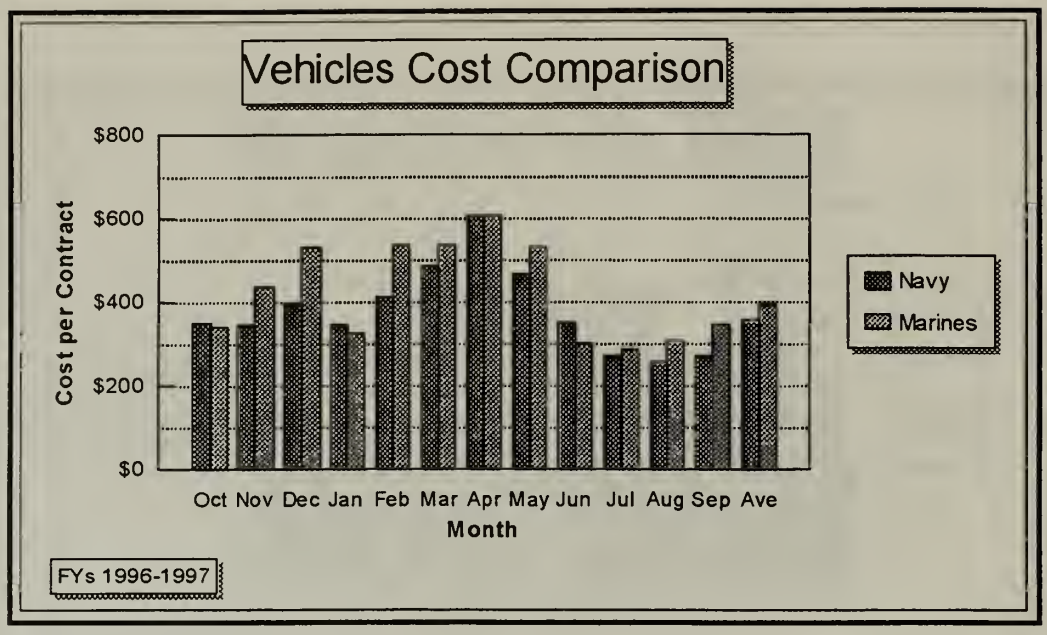


**Figure 15** Vehicles Cost Comparison

Figure 16 compares ADP costs per contract between the Navy areas and Marine Corps districts. The average Marine Corps district's ADP cost per contract is $28, or 39% higher than the Navy area's ADP cost per contract. The Navy area's cost per contract are highest during the January, February, and March time period, while the Marine Corps district's cost per contract is highest during the months of April, May, and September. Both services ADP costs are influence by the low volume graduate market contracting period, but the Marine Corps district's ADP costs also appear to be influenced by end of the fiscal year spending. End of the year spending increases are likely used to upgrade outdated computer systems. Both services ADP costs are lowest during the first quarter of the fiscal year, October through December.

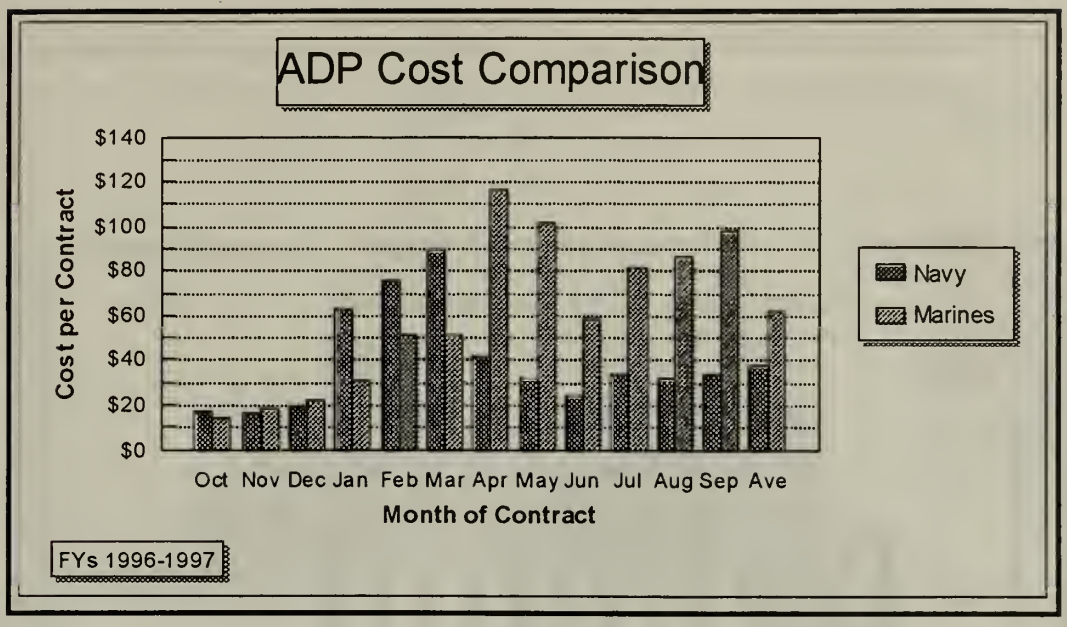


**Figure 16** ADP Cost Comparison

Figure 17 compares advertising cost per contract between the Navy areas and Marine Corps districts. The average Navy area's advertising cost per contract is $116, or 69% higher than the Marine Corps district's advertising cost per contract. The Navy area's advertising costs are highest in the graduate market contracting period due to the low volume of February through May contracts needed for near-term shipping requirements. The Marine Corps district's advertising costs are highest during the first quarter of the fiscal year, from October through December. The Marine Corps district's advertising costs are high during the first quarter because they run commercial advertisements in movie theaters during the holiday season. Both services' advertising costs are low during the high volume, high school senior contracting period in June, July and August. However, the Marine district's advertising costs per contract are low in January, February,

and March to compensate for the large amount of obligations during the first quarter of the fiscal year.

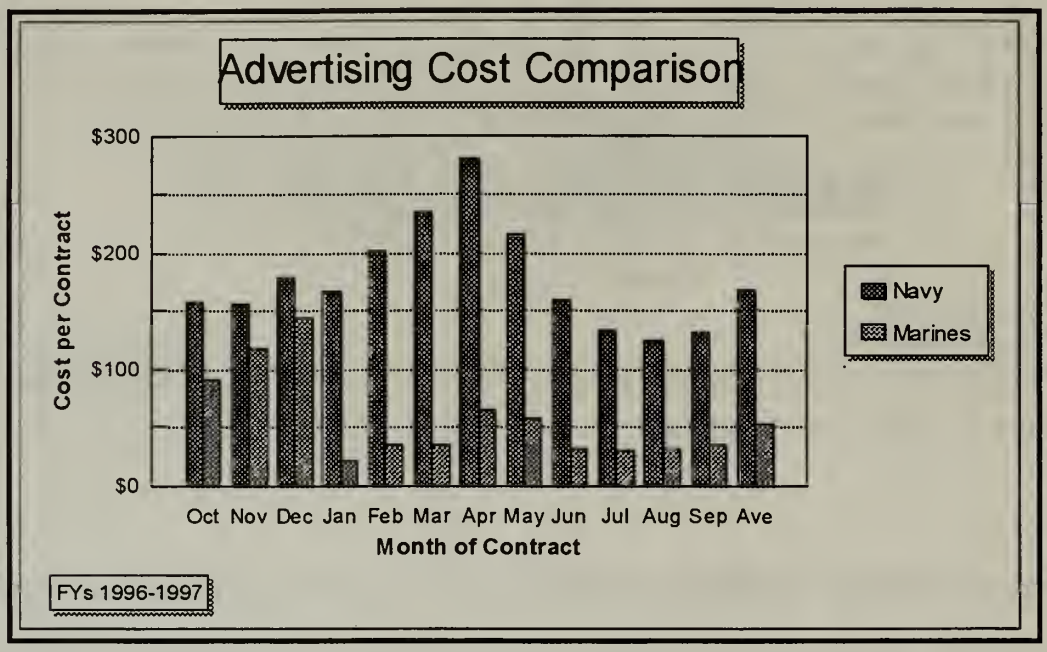


**Figure 17** Advertising Cost Comparison

## D. OPTIMAL RECRUITING PATTERN

Figure 18 compares quality contracts for both the Navy and Marine Corps by month of contract. The Navy contracts their highest percentage of quality recruits in June, July, and August; the Marine Corps contracts their highest percentage of quality recruits in August, December, January, and May.

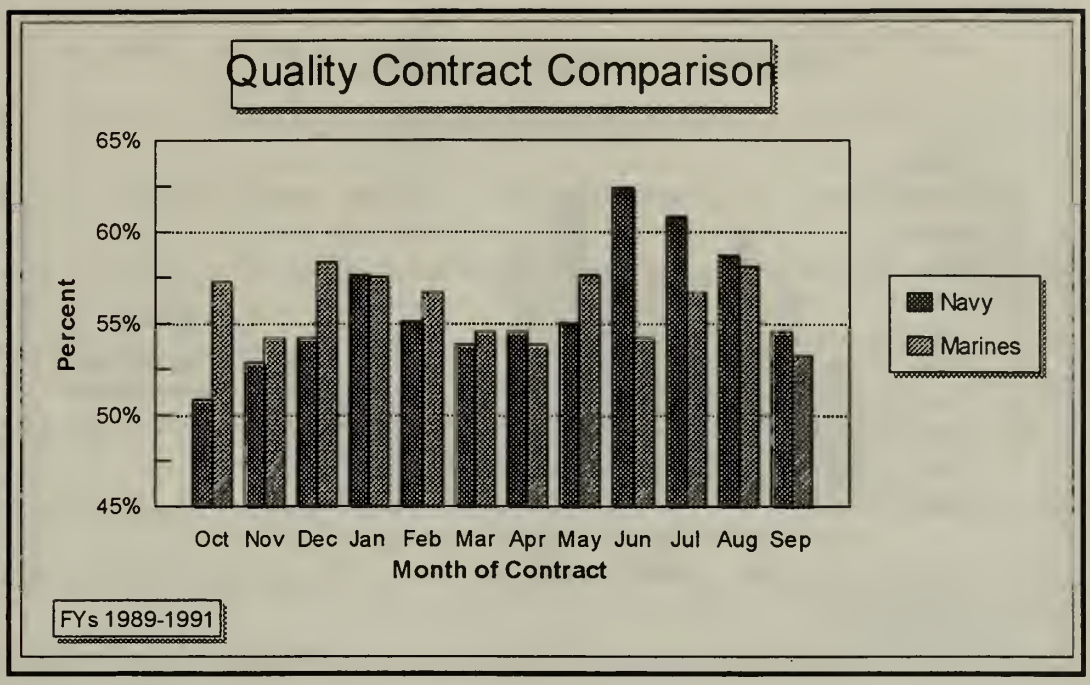


**Figure 18** Quality Contract Comparison by Month of Contract

Figure 19 compares the combined cost per contract selected Navy and Marine Corps functional area costs by month of contract. The Navy area's cost per contract is lowest in July, August, and September; the Marine Corps district's cost per contract is lowest in June, July, and August.

Figure 20 compares quality shipping for both the Navy and Marine Corps by month of contract. The Navy ships their highest percentage of quality recruits in July, January, April, August, and June; the Marine Corps ships their highest percentage of quality recruits during January, December, October, August, and May.

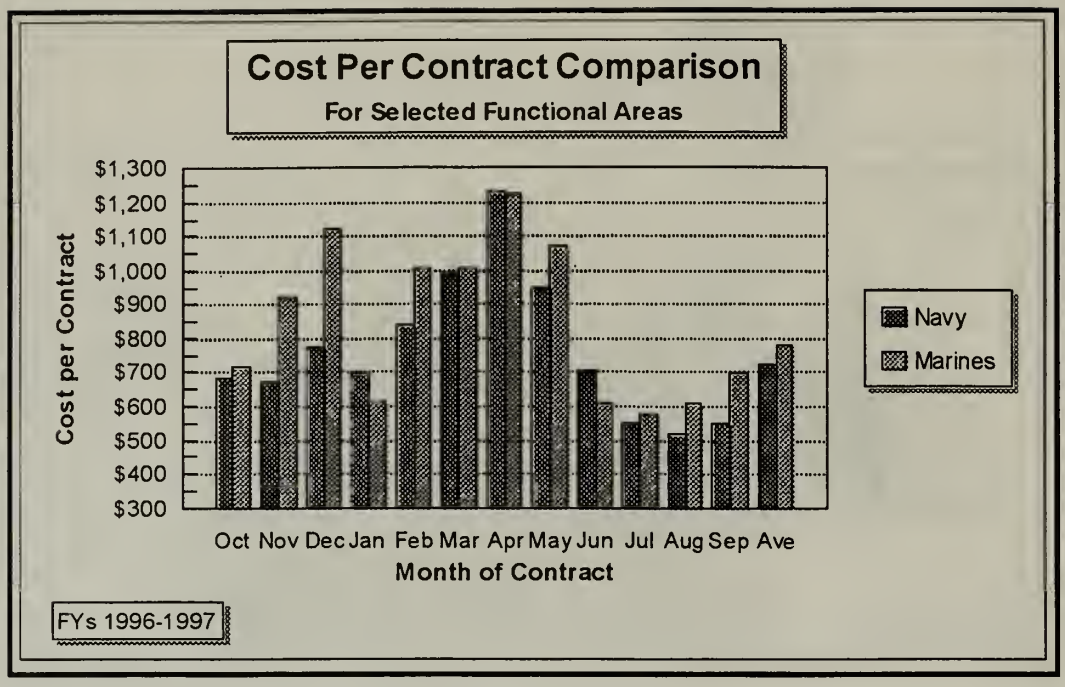


**Figure 19** Cost per Contract Comparison

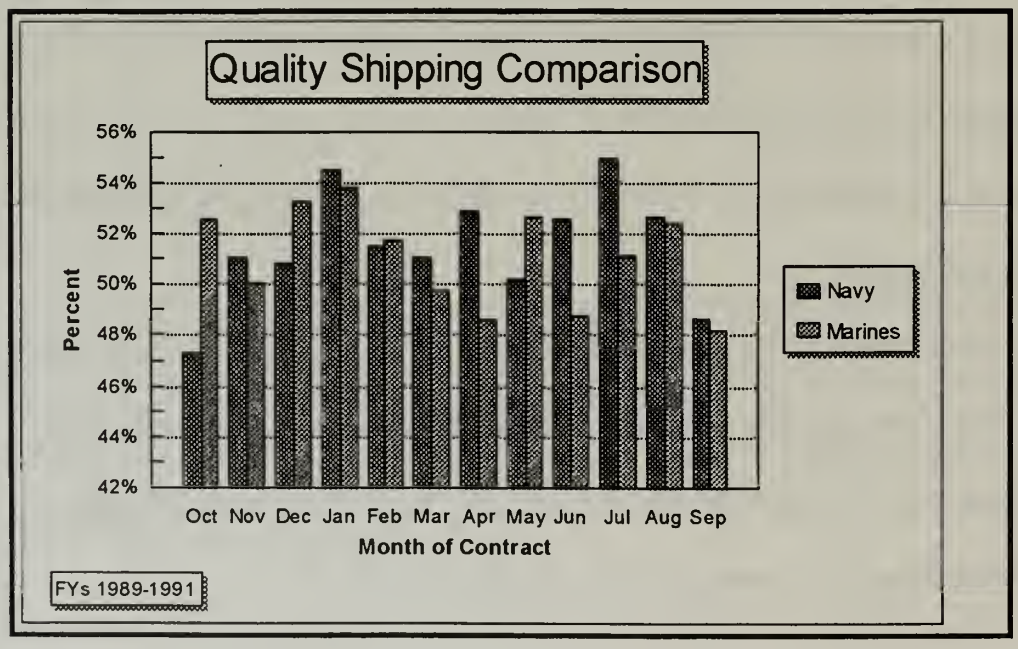


**Figure 20** Quality Shipping Comparison by Month of Contract

Based upon Figures 18 and 19, the optimal recruiting pattern for the Navy appears to be the high quality and low cost per contract months of June, July, and August. For the Marine Corps, the optimal pattern appears to be split between two separate two month periods: December to January and July to August. What is most important to both services, however, is not the quality of contracts, but the quality of contracts who ship to recruit training. For example, Figure 7 previously revealed that the Navy's DEP attrition rate for quality contracts spikes to a high of 9.9% during June. Only by comparing quality shipping, as shown in Figure 20, with cost per contract, as shown in Figure 19, can the optimal recruiting months be determined. For the Navy, the highest quality, least cost shippers are contracted during July, August, and January; for the Marine Corps, the highest quality, least cost shippers are also contracted during the months of July, August, and January.

# IV. CONCLUSIONS AND RECOMMENDATIONS

## A. CONCLUSIONS

This research attempted to determine if there is an optimal enlisted recruiting pattern based upon historical enlistment data. In order to make this determination, the following questions were examined:

1. Is there variance between contract signing and shipping date by month of the year?

2. What effect does the length of delay in the DEP have on DEP attrition and what are the causes for failure to report to recruit training?

3. Is there a correlation between time in the DEP and both completion of enlistment and reenlistment?

4. What is the monthly cost per recruit for different recruiting expenses?

Contract signing and shipping month do vary for both the Navy and Marine Corps. The variance between contract signing and shipping month is smallest from February through May and largest from June through August. A Navy recruit's average time in DEP is 4.98 months, with a 3.44 month standard deviation; the Marine Corps recruit's average time in DEP is longer at 6.4 months with a standard deviation of 3.84 months. Additionally, comparing contract placement between both services by months in DEP reveals that a higher percentage of Navy poolees are in the DEP for a relatively short period, one-to-seven months; for the Marines', a higher percentage of poolees are in the DEP for a longer period, eight-to-twelve months.

Looking more closely at the length of delay in the DEP, the longer a poolee remains

in the DEP, the more likely that the poolee will attrit from the DEP. This reflects the higher attrition rates of predominately high school senior poolees who are contracted during the summer months, June through August. Additionally, comparing DEP discharge quality between services reveals that the Navy looses a half of a percent fewer quality poolees than the Marine Corps. Finally, the most likely reason for DEP attrition for both services is refusal to enlist, followed by failure to complete high school for Navy poolees and medical reasons for Marine Corps poolees.

Analyzing DEP'ers reveals that both contract signing and delay in starting recruit training are correlated with completion of enlistment and reenlistment. For both services, the percentage of poolees completing their first-term of enlistment decreases as their time in the DEP increases. Again, this reflects the higher attrition rates of predominately high school senior poolees who are contracted during the summer months. This is not the case, however, for poolees who survive the DEP. Poolees who survive the DEP, are more likely to complete their first-term of enlistment as time in DEP increases. The DEP apparently acts as natural filter during the enlistment process; overtime, those poolees who survive the DEP, are more likely to complete their first-term of enlistment. Analyzing DEP'ers reenlistment rates for both services reveals different trends as time in the DEP increases. For the Navy, as time in the DEP increases, a poolee is less likely to reenlist; in the Marine Corps, the longer a poolee is in the DEP, the more likely the poolee will reenlist.

The monthly cost per recruit varies across different categories of recruiting expenses.

The categories analyzed include communications, vehicles, automated data processing (ADP), and advertising at the Navy area and Marine Corps district recruiting levels.

For both services, communications and vehicle costs per contract are highest in the spring. This reflects the low volume of graduate market contracts needed to make near-term shipping requirements. Communications and vehicle costs per contract are lowest during the high volume, high school senior oriented summer market. The Navy area's ADP costs per contract are highest between January and March; the Marine Corps district's ADP costs per contract are highest during the months of April, May, and September. Both services' ADP costs are influenced by the low volume graduate market contracting period, but the Marine Corps district's cost per contract, is also influenced by end of the fiscal year spending. For advertising costs per contract, the Navy area's costs are highest during the low volume, spring graduate market contracting period; the Marine Corps district's costs are highest during the fall due to holiday season commercial advertisements.

Optimal monthly recruiting periods should balance the percent of quality shippers and the overall monthly cost per contract. For both the Navy and Marine Corps, the highest quality shippers, per contract cost, occur during the months of July, August, and January.

## B. RECOMMENDATIONS

This research analyzed optimal enlisted recruiting patterns based upon historical enlistment data. Based upon the results of this research, I can only recommend that both

the Navy and Marine Corps continue to follow current enlistment polices and procedures. Recommendations to modify policies or procedures can not be tendered without adequately analyzing their potential impacts upon the current recruiting cycle. Further research should focus on analyzing potential policies or procedures by using models and/or simulation.

# LIST OF REFERENCES

1. Auditor General of the Navy Report 019-97, "Loading of Enlisted Students for Recruit Training", p. 1. January 1997.

2. McGarrahan, J., "Enlisted Entry-Level Training Pipeline "Street To Fleet" Process Update Brief", MMEA/HQMC 1997.

# BIBLIOGRAPHY


Auditor General of the Navy Report 019-97, "Loading of Enlisted Students for Recruit Training", p. 1. January 1997.

Cooke, T.W. and Quester, A.O., "Who Stays and Who Leaves? Identifying Successful Navy Recruits", CNA/CRM 88-75, June 1988.

Cooke, T.W. and Quester, A.O., "Navy First-Term Attrition", CNA/CRM 89-17, November 1989.

Cooke,T.W. and Pflaumer, D.M., "Delayed Entry and Attrition: A Review", CNA/CRM 90-229, April 1991.

Cooke,T.W. and Quester, A.O., "Success Chances for Recruits Entering the Navy: An Update, CNA/CIM 102 July 1990.

Cymrot, D.J.,"Recruit Quality and Attrition: The Puzzle of Recent Trends", CNA/CAB 95-77, July 1995.

Gericke, M.E. and the General Accounting Office, "Military Recruiting: More Innovative Approaches Needed", GAO/NSIAD-95-22, December 1994.

McGarrahan, J., "Enlisted Entry-Level Training Pipeline 'Street To Fleet' Process Update Brief", MMEA/HQMC 1997.

Morey, R.C., "Impact of Size, Composition and Compactness of the Entry Pool on Enlistment Contract Production: Efficient Allocation of Recruiting Expenditures and Optimal DEP Management", Duke University Center for Applied Business Research, November 1987.

Matos, R.E., "U.S. Navy's Delayed Entry Program: Effects of its Length on DEP Loss and First Term Attrition", Naval Postgraduate School, March 1994

Nakada, M.K., "Delayed Entry Program Attrition: Recruits, Recruiters, Contracts, and Economics", Navy Personnel Research and Development Center, November 1994.

North, J.H., "Analysis of Support Funding for Marine Corps Recruiting", CNA/CRM 91-127, January 1992.

North, J.H. and Adedeji, A.M., "Rankings by Historical Attrition Rates of Potential Marine Corps Recruits", CNA/CRM 90-219, September 1990.

Quester, A.O., "First Term Attrition in the Marine Corps", CNA/CRM 92-200, March 1993.

Quester, A.O., North, J.H., and Kimble, T.H., "Identifying Successful Marine Corps Recruits", CNA/CRM 89-314, April 1990.

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